



Magnet high school students completing an assignment to create a computer model depicting a real use of the quadratic equation. Their animated models had to work in INL's computer-assisted virtual environment – or CAVE.

## Idaho H.S. students take algebra lessons to 3-D CAVE

By Kortny Rolston, *INL Communications & Governmental Affairs*

Like many high school students, 16-year-old Heidi Schwict often questioned the usefulness of algebra and how it applied to real life.

But after building a model of a Native American shooting a buffalo with a bow and arrow to illustrate the quadratic function and viewing in a 3-D environment at the Center for Advanced Energy Studies, the Compass Academy student no longer has doubts. CAES is a collaboration between Idaho National Laboratory and Idaho's three public research universities.

"I learned about the quadratic function in Algebra I, but I didn't know what it was used for," she said. "Now I can visualize all sorts of ways you would use it. It's just exciting to understand how and why it is used."

Schwict was one of 40 Algebra II students who participated in the pilot project from [Compass Academy](#), a local magnet high school.

Their assignment was to create an animated computer model that depicted a real use of the quadratic equation that would work in the computer-assisted virtual environment – or CAVE – at CAES. They also had to present their model and the math behind it to a panel of CAES graduate students and researchers.

"Completing a project like this helps them understand how math is used in the real world and in everyday situations," said Michael Jacobson, a math teacher who spearheaded the project. "And with the CAVE, they get to see the results and use the same technology that engineers and scientists at INL do."

The project required the students, who were divided into teams, to learn a new 3-D graphic software program and conduct extensive research on the subject of their models.

For example, Schwict and her partner, Nathan Bidstrup, researched the average height of a Native American male in the 1800s, what his bow would have been made of, the velocity at which the arrow would have traveled and other historical factors in order to calculate their equation.



***Compass Academy students load their models onto the computers running the computer-assisted virtual environment – or CAVE.***

"We had to do a lot of research to make sure our equation was accurate," Bidstrup said. "We couldn't really guess."

Others researched medieval villages, pirate ships, circus cannons, motorcycle jumps and catapults for their models.

"The students picked what they wanted to do but they had to make it realistic and accurate," Jacobson said.

The project was not only a first for Jacobson and his students but also for CAES and INL, which installed the CAVE in 2010.

"This is the first time we have had a high school class complete an assignment using the CAVE," said Eric Whiting, INL's director of applied computing and visualization. "We've had undergraduate and graduate students use it, but not high school students."

To Whiting, Jacobson and the Compass students, the project was a huge success.

Kameron Chapman and three classmates created a 3-D medieval village and fired a cannonball over the stone wall that surrounded it. All four



***Students present their models and the underlying math to a panel of CAES graduate students and researchers.***

were thrilled to see the cannon shoot in the CAVE.

"It was the coolest five seconds of my life," Chapman said.

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